Occupational HAZARDS

APRIL 1940

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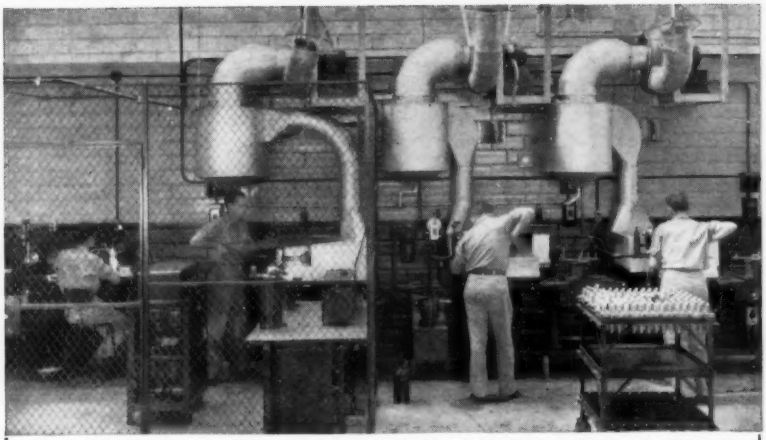
- Republic Steel Saves Money
- How General Motors Does It
- Sanitation and Employee Relations
- What Is Good Lighting
- Industrial Floor Scrubbers

The only management publication devoted exclusively to the engineering control of:

Dusts • Fumes • Vapors • Gases • Organic Solvents
Dermatitis • Industrial Sanitation
Industrial Health & Safety



K & B Exhaust System in the oil injector testing laboratory, Cummins Engine Company, Columbus, Ind.; The Austin Company, Engineers and Builders

KIRK & BLUM Exhaust System

Eliminates Oil Spray . . . Conserves Heat

In the testing of high pressure Diesel Engine oil injectors there is surplus oil spray. To avoid injurious working conditions and oil contamination, Kirk & Blum Engineers designed a unique exhaust system for the Cummins Engine Company, manufacturers of Diesel Engines. This system, not only carries off the spray, but, by employing a filter trap ahead of the suction fan, cleans the air which is returned to the room, thereby conserving heat.

If you have a dust or fume removal problem our engineers will make a careful survey and recommend a definite solution. Write today for details of this service.

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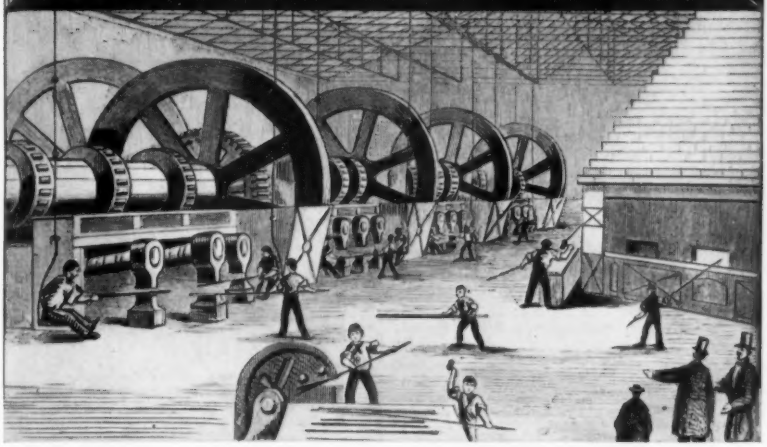
DUST AND FUME CONTROL

ENGINEERS AND CONTRACTORS

Parade of Progress—No. 3



Old time iron forgery. A marvel in its day—obsolete now.

NOTHING can stop progress. No business procedure is sacred. Nothing escapes the relentless advance of new techniques and improved methods. Successful executives must be ceaselessly alert to keep abreast of these new developments. Such executives will want to be familiar with the revolutionary new Foot Safety Plan which cuts accident losses—yet involves no expense! Recently developed by Thom McAn, and offered only by Thom McAn, this Plan has already been adopted in hundreds of the Nation's leading plants. You can quickly find out all about it—see coupon below.

THOM McAN: SAFETY SHOE DIVISION
585 FIFTH AVENUE, NEW YORK, Dept. A-4

Without obligation, please send me full details of your Foot Safety Plan. If you will stock Safety Shoes for our plant in your own stores, at no risk or expense to us, and have your own trained men fit them, I want to know all about it.

.....
Company name

.....
Company address

.....
Executive's name

The publications briefly described in this service department are prepared by manufacturers' technical experts. The data they contain on equipment supplies and prevention methods applies to varied phases of occupational hazard problems. Note those items desired on coupon below and send to Occupational Hazards, 812 Huron Rd., Cleveland, Ohio. See pages 38 and 39 for New Products.

270—**DUST PROBLEMS**
The application of precipitators to dust problems in industry is discussed in a new bulletin issued by the American Air Filter Company. See page 5.

271—**CLEAN WORKERS**
An attractive brochure points out the varied uses for the "Showerway" wash fountain manufactured by Lyon Metal Products. Operating costs and users' experience are reviewed.

272—**INDUSTRIAL CLEANING**
The complete line of Portable and Central Systems and Vacuum Tools manufactured by Spencer Turbine Company is described in a book entitled "Vacuum Cleaning a New Tool for Industry." See page 31.

273—**HEAT FAG**
In a folder entitled "Heat Fag Among Workers" Morton Salt Company discusses this occupational hazard and suggests methods of control. See page 10.

274—**SCIENTIFIC WASHROOM SERVICE**
The Scott Paper Company has released a booklet on washroom service based upon a study of hundreds of industrial plants. The recommendations which the booklet contains will be definitely helpful in providing improved washroom service.

275—**SPECIFIC SKIN PROTECTION**
A 40-page book suggesting specific skin protection for specific skin hazards is a recent release by the Milburn Company. See page 29.

276—**SALT**
The International Salt Company in a beautifully illustrated booklet points out the many operations and facilities of this company in supplying salt for industry.

277—**FUME CONTROL**
The Falstrom Company has issued literature describing their recommended methods for the control of hazardous fumes.

278—**SAFETY SOLES AND HEELS**
Attractive, descriptive bulletins suggest uses, and discuss economy features contained in the NEO-CORD safety soles and heels marketed by the Lima Cord Sole and Heel Company. See page 25.

279—**HAND CLEANER**
A pamphlet describing the uses of Lan-O-Kleen Hand Cleaner is made available by the West Disinfectant Company. See page 15.

280—**PROTECTIVE CREAM**
DuPont has issued a booklet which describes the application of PRO-TEK, a skin protective cream. See page 3.

281—**DUAL-CLONE DUST COLLECTORS**
The Day Company has issued a bulletin describing case histories in which the installation of dust control equipment has saved money.

282—**SAFETY SHOES**
Safety poster and leaflets, selling advantages of safety shoes to employees, is a service offered to industry by Thom McAn. See page 1.

FREE LITERATURE COUPON Clip out and paste on postcard or enclose in envelope.
Mail to: OCCUPATIONAL HAZARDS, 812 Huron Road, Cleveland, Ohio.

Nos. of desired items .....

Firm Name .....

Your Name ..... Position .....

Street and Number of Your Firm .....

City ..... State .....
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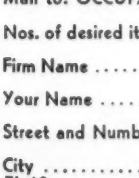

Why Good Housekeeping?

SOME YEARS ago, when we were a young man just acquiring an "industrial consciousness," the term "good housekeeping" seemed to us a strange one. We had always thought of good housekeeping as a peculiarly domestic affair. Hearing that a certain man was a good industrial housekeeper, we almost expected him to break out a skillet and whip up a batch of eggs.

But with age came comprehension. We learned that industrial good housekeeping was simply a matter of keeping your house in order. It became obvious to us that a plant cluttered up with miscellaneous equipment was neither efficient nor safe.

And then with the growing consciousness on the part of American industry of occupational diseases to which the average workman is subject, it became apparent that good housekeeping also covered control of the physical plant to safeguard the health of the worker.

While the primary incentive to good housekeeping practices may not always have been a desire to avoid the contraction of an occupational disability on the part of his workmen, progressive management learned very soon that production economies were only one of the benefits of good housekeeping. An equally important source of cost reduction came from the same means, stretched to include measures to prevent occupational diseases. Then, straight economies of manufacture brought about by good housekeeping had the additional advantage of preventing accidents, occupational disease, lost time, interruptions to production, high insurance rates, and all the other expenses visited upon those who do not take the necessary steps to prevent occupational disability.

(Please turn to next page)

AVOID SKIN IRRITATION

PRO-TEK is a greaseless cream which helps to protect the skin from physical contact with materials which may stain or cause irritation. Send for free booklet. E. I. du Pont de Nemours & Co.(Inc.), Dept. O-2, Wilmington, Delaware.

Tune In: DuPont "Cavalcade of America" every Tuesday, 9 p. m. E. S. T. over N B C.

DU PONT
PRO-TEK
REG. U. S. PAT. OFF.
THE INVISIBLE GLOVE

WHEN THE CALL IS FOR
"A BANDAGE—QUICK!"

Use **Band-me-Quick** new Individual Bandage. Made of Gauztex. Self-adhering gauze sticks only to itself—not to flesh. Medicated pad. 9-inch length. Keeps out dirt yet air circulates freely. No Throw-Aways. Each Band-me-Quick cellophane wrapped. Stays fresh. 100 to a box. Order from supply house or GENERAL BANDAGES, INC., 508 S. Dearborn St., Chicago.

GAUZTEX
Band-me-Quick
INDIVIDUAL BANDAGE

Good housekeeping has come to be the starting point in any program of industrial hygiene. For this reason, the subject is a broad one—the techniques, materials, and equipment useful in effecting good housekeeping practices are varied, and often complex. Further, there is no plant too large, no plant too small, to escape the urgent necessity for employing good housekeeping practices.

This entire issue of OCCUPATIONAL HAZARDS is devoted to this important subject of good housekeeping. To tell you how some others do it, to suggest ways and means to help you solve your good housekeeping problems, we give you herewith a number of varied discussions of the subject.

These ideas have put money in the pockets of those using them. The same ideas can put money in your pocket.

Special Offer . . .

Because of a very fortunate circumstance, we are able to offer to send you, absolutely without charge, copies of the safety and good housekeeping forms used by Republic Steel and several other large companies noted for their good housekeeping. These forms are a vital part of the program, and they will be tremendously helpful to you in building or operating a good housekeeping program. See the Republic article elsewhere in this issue. For copies of the forms, just address the Editor, OCCUPATIONAL HAZARDS, 812 Huron Road, Cleveland.

A Picture is Worth . . .

It might be the amateur photography vogue, or it may be just plain good sense, but we heard of a swell new way to encourage good housekeeping practices. The employee either has a camera, or the plant lends him one. Then he goes to his section of the plant and snaps a picture of all spots that he thinks need some fixing up. Two or three weeks later he goes back and take another picture of the same spot.

The *second* shots show some of the best housekeeping you ever saw! The secret, of course, when the picture showing the bad conditions came along, the boys got busy immediately, knowing that improvement would certainly be noticed. And the "before and after" pictures are a convincing record of progress made.

THE DISPENSER THAT *earns* ITS SALT

•NON-CORROSIVE
•MOISTURE-PROOF
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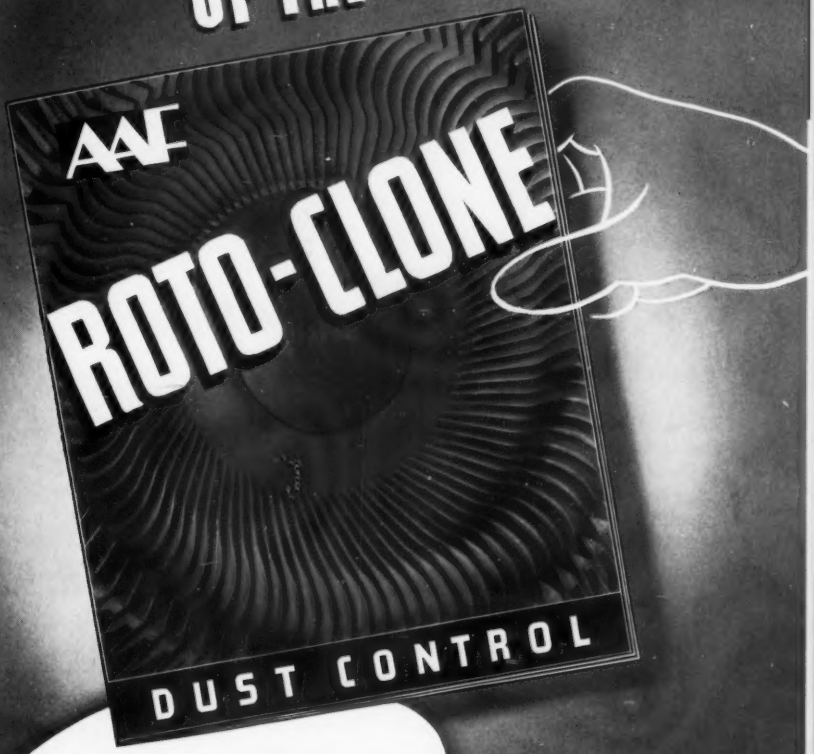
•UNBREAKABLE

MILBURN SALT TABLET DISPENS-EZE
100% Aluminum Construction
Capacity 1000 Tablets of either 10 or 15 grain size

Milburn again SCOOPS the market. For the first time a salt tablet dispenser that . . .
1. Is guaranteed against corrosion
Specially treated aluminum prevents corrosive elements from contaminating salt tablets.
2. Will not break
100% extra-heavy aluminum construction can take all knocks.
3. Resists moisture
Sturdy body design keeps salt sealed.
4. Can not be tampered with
Approved Yale lock standard on all dispensers.
Get this outstanding dispenser installed before the hot weather sets in. Write to-day for complete details.

MILBURN COMPANY
905 HENRY ST. • • DETROIT, MICH.
MANUFACTURERS OF PLY INDUSTRIAL SKIN PROTECTION

A COMPLETE PICTURE STORY OF THE ROTO-CLONE



Your Copy is Waiting—Write Today!

We have prepared for your study a story in many pictures and a few words, on the application of the Roto-Clone Dynamic Precipitator to dust problems in Industry.

Illustrations show its use in the collection of practically every type of industrial process dust and the means of eliminating dust hazards easily and economically.

For convenience, use the coupon!

AMERICAN AIR FILTER CO., INC.
280 Central Avenue, Louisville, Ky.

Please send me your latest bulletin—"Roto-Clone Dust Control"

Name .....

Company .....

Address .....

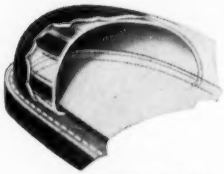
City .....State .....

"I HATE the Place Where Harry Works"

HARRY PAVLAC'S wife is sure he works in a dreadful place. Harry came home with a smashed foot . . . laid up for six weeks. Though the accident was Harry's fault, now his wife thinks he works for heartless employers who underpay him for dangerous work . . . who don't give a thought to his welfare or that of his wife and children.

Harry's accident didn't need to be an *injury!* Had he worn Hy-Test Safety Shoes, almost certainly the anchored steel toe cap would have protected his foot as it has thousands!

Write today for a Hy-Test representative to call. Let him give you the whole story of Hy-Test superiority in just five minutes time. His visit may mean a tremendous saving in time, money and manpower to your company.



"TURRET-TOP" TOE PROTECTION

Hy-Test models fit for every job. Many fit for Sunday, too.

HY-TEST INTERNATIONAL SHOE CO. SAFETY SHOES

HY-TEST SAFETY SHOES

Designed and Manufactured Exclusively by Hy-Test Division, The International Shoe Co., St. Louis, Mo., The Nation's Largest Shoe Manufacturer

Occupational HAZARDS

APRIL 1940

Volume 2 Number 7

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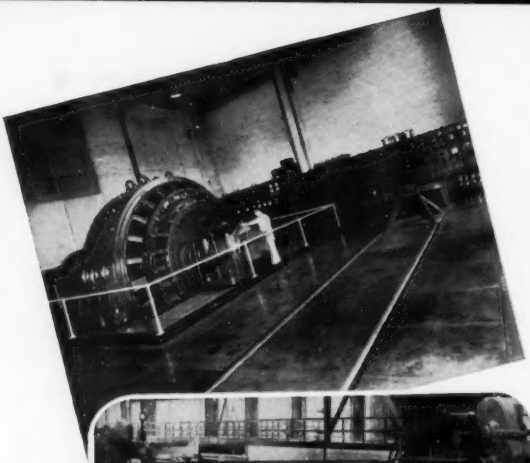
812 Huron Road, Cleveland, Ohio

Irving B. Hexter, President — L. P. Aurbach, Vice-President
Jack Weis, Associate Editor — William S. Papworth, Associate Editor

Republic S



● *Motor Room in a Republic Steel Plant. Note good condition of floors and walls; railroad siding designed for maximum cleanliness and safety. Note also absence of debris or unnecessary materials.*

● *Continuous strip mill, showing electrical temperature recorder. Note guarded bridges for complete safety. The entire operation is orderly and clean, which is highly conducive to safe, efficient operation.*

● *Individual lockers are provided for the more than 2,000 men. This room is kept thoroughly and continuously clean. Wash fountains and sanitary facilities, together with adequate lockers, enable the workers to guard against skin infections. Note step and time saving arrangements. This installation pays Republic Steel dividends in healthy workers—which means better and more economical production.*

Steel's Housekeeping Program

By B. T. DYE, Safety Supervisor, Republic Steel Corporation
Warren, Ohio

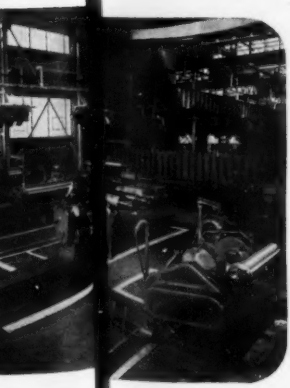
A discussion of the methods employed in developing and operating the good housekeeping program of this large organization

FOR A NUMBER of years management has recognized good housekeeping as an important factor in waste elimination and accident prevention.

Some people have a mistaken notion of good housekeeping. They think of it in terms of janitors and expense. But the facts are quite the contrary. In the main, a clean and orderly plant is a step toward operating economy, and cannot be obtained with janitor service alone any more than a wife can keep a home clean and orderly unless the whole family helps. Therefore, the problem, as I see it, is one of creating employee interest in maintaining a clean and orderly department.

In most manufacturing plants today you will find definite evidence of a housekeeping program. This has been recognized by the management as being just as necessary as a good safety program. The fact is that they dovetail so closely that if properly carried out it is difficult to differentiate between the two and I am certain neither a good safety program nor a good industrial housekeeping program can be satisfactorily carried out without the aid of or the encroachment of the other program.

I know of no plan for Industrial Housekeeping which is 100% efficient. I mean by that, one that cannot be criticized or taken apart. In some organizations, no set plan of clean-up is followed; the cleanliness of sanitation problems being left to the individual department heads, who in turn delegate their supervision to some lesser individual, who usually has many other things to think about and doesn't take time to properly carry out this part of his assignment. Still other organizations have cleanup inspection committees which are usually composed of two or more department heads or foremen. These committees function for a set period of time and are then changed. Rarely do these committees inspect the same departments in successive months and are, therefore, in no position to take into consideration the conditions prevalent in any one department over a period of time. We attempted to use a committee system for a number of years. Many reasons were found



● *View of the shop in the 98" continuous strip mill. Note lanes for traffic, orderliness of all details, and freedom from any extraneous materials which might be hazardous to production or workers health.*

for its abandonment. The job was hurried over by the committee, the department inspected not given justice, or it developed into a more or less grudge type of inspection, wherein one superintendent would take the attitude of "you kill my dog, I'll kill your cat." This, you can readily see, would promote discord in your organization and poor housekeeping in the plant or the departments involved.

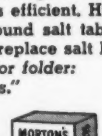
After carefully observing the fact that we were making little or no progress in housekeeping in our plant, and listening to the monthly arguments that arose between our superintendents at each executive safety meeting, it was concluded that the plan was a failure and that some other method of promoting good housekeeping would have to be worked out, which would give the actual picture of the conditions in the plant each month in the year and also indicate whether or not progress was being made, with fairness to all departments in the district. We formulated a plan of inspection which was in all its phases agreeable to all parties concerned. This was achieved by placing the responsibility for all inspections directly with the Safety Department. Said inspections to be made by the Fire Marshal, who is vitally interested in housekeeping from a fire prevention point of view and also who is a part of the Safety Department, familiar with all rules and regulations relative to safety and cleanup, as well as with all operations in the various departments. He is assisted by a previously designated man from each department and, when possible, by the Safety Supervisor in making his monthly inspections.

This also gave us a method and

Loosen HEAT-FAG'S Grip on Your Plant

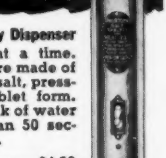
PROVIDE salt tablets freely to all workers who sweat. Doctors know that salt sweated out by heat and heavy work must be replaced, or workers tire quickly, and are less efficient. Hundreds of great industries have found salt tablets the simple, inexpensive way to replace salt loss and check Heat Fag . . . *Write for folder: "Heat Fag Among Workers."*

MORTON'S SALT TABLETS

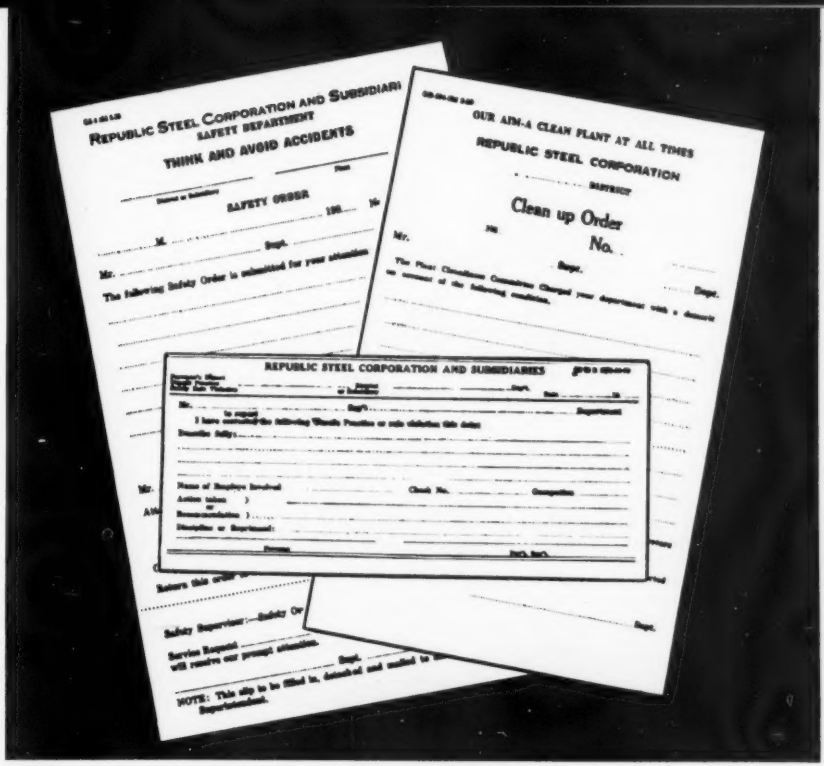


Morton's Modern Sanitary Dispenser
Delivers tablets one at a time. Morton's Salt Tablets are made of the most highly refined salt, pressed into convenient tablet form. Easy to take with a drink of water — dissolves in less than 50 seconds after swallowing.

ORDER NOW . . . *Dispenser* $4.50
Case of 9000 10-grain salt tablets $2.60
Shipped Prepaid



MORTON SALT COMPANY CHICAGO, ILLINOIS



● ***These forms have enormously increased the effectiveness of Republic Steel's housekeeping and safety program. Such forms are invaluable in operating a good program. You can get a set of these forms, plus other similar forms from other companies, by writing a letter or post card to the Editor, Occupational Hazards, 812 Huron Road, Cleveland. They will be sent without charge.***

opportunity of following up on conditions or demerits charged the previous month, and in order to add force to those demerits not cleaned up between inspections, they are charged double against the department when found the second time. While inspecting this department for good housekeeping, it is also inspected for unsafe practices, and unsafe conditions. These practices and conditions are called to the attention of the department head in which they are found and when the cleanup report is being consolidated, unsafe practice reports and safety orders are written against those conditions and practices noted, and forwarded at once to the superintendent involved.

(To be continued)

Next month Mr. Dye will discuss methods of inspection, and the operation of the demerit system.

PLAN

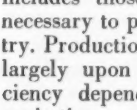
By W. E Obe

THE term "sanitation" comes from the word "sanitas," meaning health. Sanitation, therefore, can be defined as health measures. Plant sanitation which is another way of saying good industrial housekeeping, includes those measures which are necessary to promote health in industry. Production in any plant depends largely upon labor. And labor efficiency depends largely upon plant sanitation.

From the standpoint of public health, sanitation quite often means water supply and sewage disposal. Both of these essentials should be taken into consideration in selecting a location for a plant. Plants located in small towns which are not provided with public systems of water supply and sewage disposal often have very poor equipment. They depend upon wells for water supply, and have no sewage system. It occasionally happens that similar plants are found in some of our large cities. Wherever possible, sanitary drinking fountains supplied with pure, cool water should be located at convenient places throughout the plant.

Washrooms

The construction of a suitable washroom or locker room should be a part of every building program. This is especially true in industries in which the type of work is such that frequent washing or shower baths



Lunch Rooms

Where lead, arsenic, benzol, various dyes and other poisonous substances are used, a lunch room should be maintained where employees may eat their lunches away from the fume and dust laden work place.

Light

Modern plant sanitation also requires a proper amount of light for all operations. Many plants that have been operating for years have found it profitable to install new lighting equipment. Proper lighting not only makes the work easier and aids in preventing eye strain with resulting

What
PLANT SANITATION *Means to You*

y W. E Obetz, M.D. *Medical Investigator, Industrial Commission of Ohio*

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are necessary in order to maintain the health of the workers. Where a change of clothing is required, lockers should also be provided. Plants having serious health hazards that do not have sufficient washing facilities for the use of their employees are not uncommon. In many instances a small washroom is maintained with only one or two wash bowls, no provision for soap or towels, and no janitor service to keep the washroom in usable condition. The ideal washroom contains enough equipment for the number of employees in the department, is kept clean and warm, is provided with hot and cold water, with wash bowls and shower baths, and is adjacent to the locker room.

headaches and visual defects, but also promotes safety. Many industrial accidents have resulted from improper illumination.

Heating

Suitable temperature is another important factor in plant sanitation. Wherever possible excessive heat and likewise unusual low temperatures should be avoided. Modern air conditioning has done a great deal in the maintenance of proper temperatures and adequate ventilation.

Ventilation

In providing adequate amounts of fresh air, dust, steam, smoke, fumes and vapors must be eliminated. Each

of these, if present in undesirable amounts, can affect the health of workmen. During the last few years there has been a great deal of attention given to industrial dusts, especially silica and the disease resulting from its inhalation (silicosis). The elimination of dust is one of the big engineering problems with which employers are confronted today.

Steam and smoke are objectionable in that the air is contaminated and vision is obscured. Fumes and vapors may be given off by chemicals that contain irritating substances which may react upon the eyes, the skin or the respiratory systems. Provision must be made to carry off the industrial poisons in the form of dust, fumes or vapors which are so often found in industrial atmospheres.

A good example of a common plant operation in which there is a need for good sanitation is found in the various plating operations. Here various solutions are used containing chemicals which may react in various ways. Chrome, nickel, cyanide, caustics, acid dips and galvanizing solutions all have a part in plating. Skin diseases, often called platers' itch, frequently result from the action of these solutions or vapors upon the skin. Acid burns also result from contact with various chemicals. Proper washing facilities and the use of protective clothing such as rubber gloves and aprons are very important in preventing such dermatitis.

Lead

Lead poisoning is still one of the prominent occupational diseases. It results from the breathing of lead dust or fumes, by the eating of lead with food, or by getting it in the mouth from the fingers. To avoid lead poisoning great cleanliness is required to keep the workroom free from dust, and to remove all fumes and vapors that may contaminate the air. The provision and use of adequate washing facilities cannot be over-emphasized in the prevention of lead poisoning wherever lead is used.

● ***No good housekeeping program will forget office workers. Adequate sanitary facilities, soap or other hand cleaner, and towels are vital in maintaining the well-being of office workers. Once installed, don't forget that these wash rooms must be maintained in a completely sanitary condition.***

Photos Courtesy Monarch Machine Tool Co.

PLANNED PREVENTION PAYS!

LAN-O-KLEEN.... The New
Hand Cleaner
plus WEST
PROTECTIVE
CREAMS
You will agree that proper personal cleanliness is the most important step in combatting occupational skin diseases. The most satisfactory cleanser is one that cleans the skin thoroughly and yet is not irritating. LAN-O-KLEEN has as its base corn meal in which has been impregnated a high percentage of Lanoline Oil. LAN-O-KLEEN contains no grit, pumice, caustics and does not tend to irritate the skin.
constitute a most effective combination to help control occupational skin diseases due to external irritants.

WEST
DISINFECTING
COMPANY

West Disinfecting Co., Dept. OS, 42-16 West St., Long Island City, N.Y.
Please send me a sample of Lan-o-kleen

Name ..... Firm .....

Address ..... City & State .....

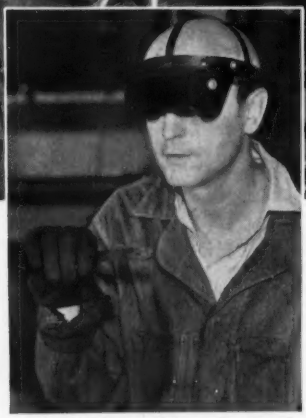
Solvents

Another common source of occupational diseases is found in the various solvents that are used in industry today. These include, among others, benzol, gasoline, naphtha, carbon tetrachloride, trichlorethylene and their derivatives and compounds.

The use of benzol in industry has been greatly reduced during the past few years because of the dangers of benzol poisoning. However, in some plants and operations it is still used, and occasionally cases of benzol poisoning are reported. Benzol is very volatile, and the inhalation of fumes produces a form of anemia which, in susceptible persons, results in serious illness and frequently causes death. To avoid benzol poisoning it is perhaps best to find a less toxic substitute and discontinue the use of benzol completely. Toluol and xylol are less toxic and also gasoline and naphtha can frequently be substituted as suitable solvents. While these substitutes are not entirely harmless they are less toxic than benzol.

Carbon tetrachloride and trichlorethylene have recently become popular for dry cleaning and degreasing operations. They are not only good solvents, but are non-inflammable. Both, however, are poisonous when inhaled in high concentrations. They are very much like chloroform in their action and produce weakness and even death, largely by their action upon the liver and kidneys. This is also true of some of the other solvents in the class called chlorinated hydrocarbons. These solvents should be used only where adequate provision is made to keep the operation enclosed to prevent contamination of

(Turn to page 40, please)



By slightly tilting the head backward, operator inspects work through under-vision.

Operator welding with Type B shield. Fireproof cap (which can be supplied when desired) deflects sparks—gives added comfort.

Operator at ease. Shield in up position.

JACKSON Eyeshields

Safety—Wide Vision—Comfort

For oxy-acetylene welding and cutting, this Type B shield (patented) is hard to beat. Well ventilated and non-fogging, the Bakelite lens frame takes standard specification (2″ x 4⅛″) lenses. Side protectors are of non-inflammable, opaque fibre. Multiple adjustment assures a fine fit to any head. If your dealer can't supply you, please write to us.

Write for eyeshield folder describing this and fourteen other types.

JACKSON ELECTRODE HOLDER CO.

Department O-1

15122 Mack Avenue — Detroit, Michigan

Industrial Floor Scrubbers

By R. M. BLISS, Finnell System, Inc.,
Elkhardt, Indiana

A means of reducing Good Housekeeping costs and making your plant safe for workers

ADVANCEMENT in industrial hygiene practices is largely responsible for the pronounced trend toward maintaining a clean industrial plant. Since clean floors furnish a sound foundation for a clean, orderly factory, it is important that a system of cleaning be instituted to keep floors free of dirt and accumulated debris.

Industrial Dry Scrubbing

While certain types of cleaning are best done by vacuum cleaning or by sweeping, many plants (particularly metal working plants) present a problem. Dirt filters to the floor little by little. It's greasy, the traffic is heavy. Soon it is packed down hard—and thick. Hand scrubbing is futile; it won't touch it. Spudding costs a lot of money, and the results are not always as good as is desired.

To meet the need for cleaning floors subject to this kind of accumulation, machines have been put on the market. Such industrial dry scrubbing machines (see illustrations) dig in and cut through the dirt by means of powerful scarifying brushes carried on the front. Experience has proved that these machines will remove accumulations of dirt that hand scraping usually fails to remove.

It does not much matter what substance your floor is made of. The dry scrubber will work well on woodblock, factory maple, steel, metal, concrete, industrial composition—in fact almost any industrial floor.

● *Electrically powered floor scrubbing machines enable you to clean your plant floors more quickly, with fewer men, more thoroughly, with a considerable saving in cost.*

An Auto Body Manufacturer

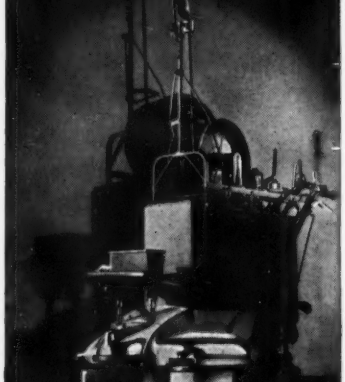
The recent experience of a well-known manufacturer of auto bodies is an interesting story of how they were able to keep their plant much cleaner than it had ever been, and save money at the same time. The

first installation in this plant was a dry scrubber to maintain clean wood-block floors between the large stamping presses. Their floors had repeatedly accumulated as much as 3/8 of an inch of dirt, and grease. Heavy tractors had forced punchings and chips into this mess, making a combination nearly as hard as concrete, and just as difficult to remove!

After trials, the first machine was installed. It performed so well on this particular job that the Superintendent of Sanitation and Safety placed an order for the second machine, to broaden the field of activity.

It is interesting to note that these two machines replaced an ungainly steam mechanism. It took two men to operate, and was able to cover only 1000 square feet per day.

● *A modern design in floor scrubbing machines. Note compactness of unit, device for handling electrical connection. This unit is power driven, and can be used with a crew of one or two men.*



The two dry scrubbers took two men to operate, of course. But the same two men, two scrubbers, covered twice the area in the same time, did a better job, and saved $4,000 per year over the old method.

Don't overlook the fact that a cleaner plant made for more healthful conditions and, in addition to the direct money savings of over $4,000 a year, the company stood to benefit in lowered insurance rates and increased production as a result of fewer worker disabilities.

Metal Working Plant

If you have a floor cleaning problem, look at the experience of a well-known metal working plant. This happens to be the assembly line of an automobile factory, and one of the particular problems is to remove the polishing paste accumulating from polishing of bodies. Because the polishing paste is used so generously, it builds up quickly on the floor. Originally, the floors were cleaned by several men using hand spuds—a back-breaking, discouraging job for the men. And certainly a discouraging one for the man that paid the bills!

So they bought a dry scrubber. One man operates it, cleans 150 feet of assembly line an hour, averaging a strip 4 feet wide. The machine absolutely scours the floor, so that the accumulation may be vacuumed or swept up easily.

Here, again, is the important factor of worker health and morale. Clean floors are safer, of course, but in addition, clean floors encourage good housekeeping on the part of the men, thereby making the whole factory safer. Accidents, such as slipping, trucking and handling accidents, fire hazards, are all reduced by maintain-

● ***Floor scrubbing machines are made in several sizes to fit varying industrial conditions. Machines should be chosen with a view to the size of the open space to be cleaned, the floor area, and the amount of the dirt to be removed.***

ing clean floors. Controlling these hazards saves money, just as real savings as the money saved through the use of the scrubbing machine itself.

Industrial Wet Scrubbing

Many plants, depending upon the type of process and the condition of the plant and floor, prefer to use wet scrubbing. Once the floor has been thoroughly cleaned, the schedule is one good wet-scrubbing every day.

Wet scrubbing used to be a matter of mops and pails, or even brushes on the hands and knees. A refinement of this method came with rather crude machines using motive power gained by pushing the machine along. The more recent development is the electrically driven machine. Power is used to drive the brushes and cleaning mechanism, as well as to move the machine along over the floor. Complete power wet-scrubbing used to require an assembly of units for the various operations. This made the cost high.

More recently, though, has come the combination floor scrubber, rinser, drier. The illustration shows one such self-propelled machine. This device automatically distributes the correct amount of scouring on the floor, scours the floor (removing oil and grease deposits), rinses and dries the floor. One machine and one operator can be expected to clean as much as 6,000 square feet of scrubbable floor per hour. Usually two men are used

in the complete cleaning crew with this tooling.

For special locations, for smaller operations, and narrow congested areas, the manual type of scrubber, drier, rinser is desirable. Like the power driven model, it does the complete job, but can operate in places where the larger machine cannot go.

Two recent installations in the state of Michigan give you some idea of the savings. In addition to cleaner floors more quickly, one of these companies saves $225 per month in direct monetary savings.

Oily Floors

A particularly hazardous, expensive, and troublesome condition is oily floors. Wet scrubbing is indicated for those oily floors. For instance, one plant installed wet scrubbing ma-

(Please turn to page 26)

MAXIMUM PROTECTION

in LEHIGH Safety Shoes!

Safety shoes have one primary duty . . . to protect the toes from injury. And Lehighs are carefully designed to provide *all* the toe protection that modern engineering science has been able to devise.

HERE'S HOW

1—THIS STEEL TOE BOX,

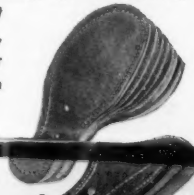
built into every pair of Lehigh Safety Shoes, is made of high-carbon, cold-rolled steel . . . electrically tempered for flawless strength, and rust-proofed for long life. **NOTE THE FLANGE** which roots the toe box solidly between sole and upper so that it cannot shift or tilt during the life of the shoe.

2—SAFE! A 2½ TON RING

fell on the toe of this Lehigh shoe! The impact dented the sole of the shoe into the floor planking. The man wearing the shoe suffered NO INJURY beyond a bruised big toe!

3—ENGINEERED TO THE JOB

Industry does not have to fit itself into a few stock types of Lehigh Safety Shoes. Lehighs are designed to *fit into industry!* Special sole and upper constructions are available for many, special industrial problems . . . *cost less*, in the long run, because they *wear longer!* Here are a few examples:



HOT MILL SOLE

life of the shoe.

because they wear longer! Here are a few examples:

HOT MILL SOLE

NEOPRENE
"Oil Fighter" Sole

PAR-GRIP
Skid-Proof Sole

4—TOP QUALITY THROUGHOUT! Lehigh Safety Shoes are made on a variety of specially designed lasts, of plump, sturdy upper leather . . . double reinforced at every point of wear and strain . . . Top quality in every detail of construction. Check and compare the 18 better-quality features of this typical Lehigh shoe!

5—BETTER FITTING!

A touch of the lever and correct safety shoe size and width are indicated instantly and automatically on the dial. An inexperienced clerk can fit shoes like an expert with the aid of this handy device, available to every industrial user of Lehigh Safety Shoes.

EVERY PAIR of Lehighs is as fine a work shoe as money can buy . . . and as safe as modern science can make them! You get maximum protection...longer wear...top quality...in LEHIGHS!

LEHIGH SAFETY SHOE CO.
ALLENTOWN, PA.

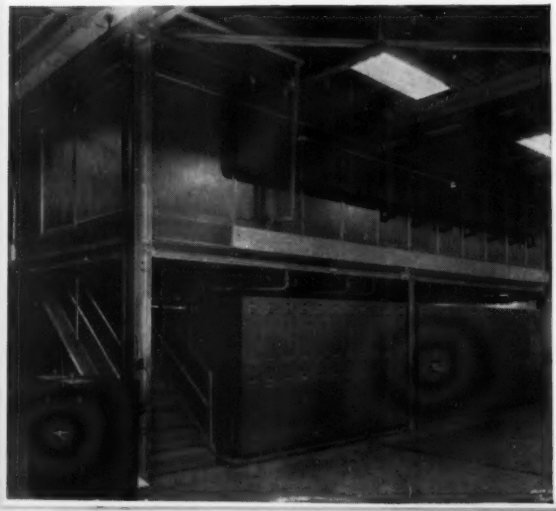
How General Motor Uses . . .

- **Sanitation Equipment**
- **Exhaust Systems**
- **Air Conditioning**

GOOD INDUSTRIAL housekeeping is done either because of the nature of the plant and equipment, or in spite of it. The new plant of the Allison Division of General Motors, just completed at Indianapolis, is one of the finest examples of a plant that was designed, engineered, and built to encourage good housekeeping practices.

The Allison plant is typical of the new conception of good working conditions. Particularly significant is the fact that the whole plant—building, processes, and tooling—was carefully designed in advance to provide the maximum of production efficiency, good working conditions, and freedom from industrial health hazards. While it is true that this Allison plant is very nearly ideal from the standpoint of good housekeeping and worker well-being, these objectives were not the sole reasons for this type of construction. The fact is that General Motors has long since learned that production efficiency, minimum spoilage, employee health, and freedom from lost time go had-in-hand to give economical operation.

Mr. O. T. Kreusser, General Manager of the Division, says "Manufacturing requirements in the new plant created conditions to be met



● *At three convenient points throughout the plant are complete sanitary facilities. The hollow square formed by the lockers encloses wash fountains. The mezzanine floor above contains toilets, which are completely enclosed. Note good condition. Electrical water cooler in foreground provides an adequate supply of pure, cooled, drinking water.*

● *The interior of the hollow square formed by lockers. (This is the interior of illustration on opposite page.) Three modern wash fountains, hand cleaners, and towels keep the workers clean, minimize the dangers of dermatitis and skin infections.*

which gave us an unusual opportunity to try out advanced thinking in factory construction." Just what does this mean?

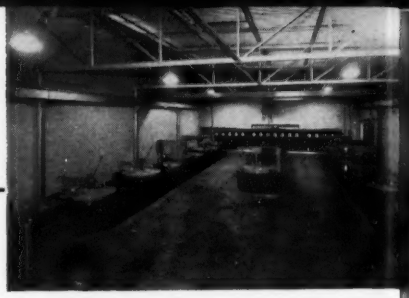
In this case it means a plant that is completely air-conditioned, artificially lighted, adequate sanitary facilities of the most modern type, an ingenious type of dust removal, plus attractive surroundings that make for good personal housekeeping by the men themselves.

Mr. Kreusser continued, "Our program for the manufacture of aircraft engines for the United States Army calls for a high degree of precision and careful handling of materials. Temperature changes affect the micrometric gauges and precision instruments workmen constantly must use. Perspiration, in this climate, may cause etching of highly polished metal surfaces, sometimes from just a sweaty finger print. Unusually fine lighting is required for accurate reading of gauges and observance of work by operators. Comfort of workmen is unusually important because of the concentration and skill required."

Air Conditioning

The windowless, completely air-conditioned plant serves the dual purpose of providing ideal conditions for both workers and product. The essential point considered is that workers must be at top-notch efficiency to do the exacting work properly; so good working conditions make good products.

The air-conditioned plant not only controls temperature and humidity but also guarantees the cleanliness of the air. Dust or other foreign matter in excessive quantities in the air would be as bad for the workers as for the product being manufactured.



● *Heat treating department of Allison Division Plant, showing arrangement of ovens. To enable workers to get at the ovens more quickly, easily, and safely, the ovens are sunk in the floor.*

Dust Elimination

In addition to the general ventilation through circulation of conditioned air, dusty operations employ a unique type of exhaust equipment for the removal of dust at the source. Note the illustration of the casting cleaning room. The tables (right height for worker comfort) have slots running along the fore edge. Dust from the grinding machines is sucked into these slots, and carried away. This particularly ingenious device for preventing the dust from reaching the breathing area of the workman is arranged so that as the exhaust system sucks the dust through the slots, the fresh, clean air enters the room at the top, thereby creating a steady stream of clean air *away* from the breathing area of the workmen. The exhaust system not only removes the dust, but draws clean air across the breathing area of the men.

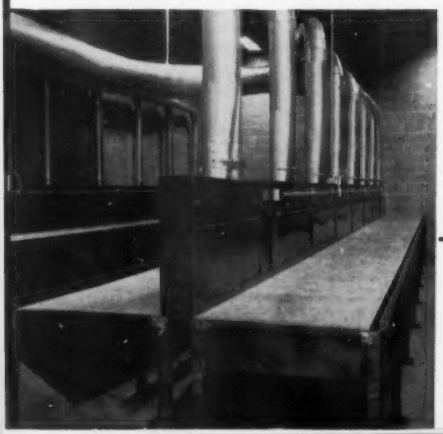
Sanitary Facilities

Again, with the dual purpose of protecting the product while protecting the workmen, the Allison plant provides the most modern locker and wash rooms. Instead of the conventional locker-room type of construction, the wash-up facilities, lockers, and toilets have been arranged in units at three different convenient points throughout the plant. As can be seen in the accompanying illustration, the lockers form a hollow square, with wash fountains inside. In a mezzanine above each group are the toilets, completely enclosed. At each of the three groups are also located electric drinking fountains.

The combination of air conditions to prevent excessive sweating, plus adequate washing facilities, do a great deal to prevent the contraction of dermatitis.

Lighting

One of the most important features of the new windowless plant is the lighting system. There is probably no other single item which is as conducive to good housekeeping as is good lighting. The Allison plant is the first large industrial plant to be equipped with the new type of fluorescent lighting. Each lighting unit consists of a reflector containing three 40 watt lamp bulbs, 48 inches long,



● *Casting cleaning room. Note slots at forward edge of bench. Air is sucked down through these slots, away from breathing area of workers.*

and one and one half inches in diameter. Fluorescent lights give off very little heat, the average being about one-third of the amount given off by the usual incandescent bulbs. The coolness saved about one-third in power required for air-conditioning.

As a result of the careful design of the lighting installation, the average light reaching the work-area is from 28 to 30 foot-candles. This is vastly higher than that of the average plant.

The *amount* of light is important, but equally important is the *quality* of light. The Allison installation of fluorescent lighting gives a quality of light that cannot be detected from noon north daylight. Another *qualitative* aspect of the light is that it is soft. It bathes the plant in light, rather than shines.

The result of this system is a high intensity light, with low brightness; practically no glare, and a minimum of shadows. From this, Allison gets greater accuracy in production, and less spoilage, plus greater worker contentment, freedom from eye strain and other disabilities due to poor light; fewer accidents, and an excellent good housekeeping program.

Attractive Surroundings

It is an axiom of good management that workers will do a better job of housekeeping in attractive rather than sloppy surroundings. Once clean, workers tend to keep the plant clean. The Allison plant is conscious of this; consequently, they made the plant and equipment as attractive as possible. The walls are well-painted in an attractive color scheme; the machines are painted in a medium light

(Turn to page 40, please)

TAKE STEPS

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How many falls occurred in your plant last year? Some might have been carelessness, but the majority could have been avoided. HOW? By the use of NEO-CORD, Cord on End non-slip, long-wearing, *oil-resisting* soles and heels.

Don't let the high cost of slipping accidents eat into your profits. Save money and at the same time protect your workers. Insist on the genuine NEO-CORD soles and heels. Write to-day for free trial offer to test in your plant, under your exact conditions.

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applied with experienced engineering skill get results. Health, fire and explosion hazards are greatly reduced.

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GARDEN CITY FAN CO.
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Branch Engineering Offices in Principal Cities

Industrial Floor Scrubbers

(Continued from page 19)

chines and saved $100 a month on the cost of sawdust, of which they had used 13 bags a day. This plant, which is located in Chicago, has a floor area of 640,000 square feet, half concrete, half hard wood. The floors were so oily that oil dripped from some of the ceiling, having seeped through from the floor above. Sawdust was used to try to absorb some of this oil. 27 janitors were required to maintain any semblance of cleanliness, and even then the floors were dangerously hazardous.

In addition to these difficulties, when sawdust was used to absorb the oil, it was dispersed into the air, clogging oil lines. Naturally, this slowed or stopped production, and was very expensive.

With the new wet scrubbing machine, using four men to a crew, they scrubbed 120,000 square feet of floor per night. This was accomplished by putting 4 men on an eight hour shift, or by spending 32 man hours a night per machine. Two machines were necessary because of the large areas, thus requiring 64 man hours per night.

This installation saved 152 man hours per night, resulted in a clean condition of the floors, and reduced the accident and fire hazards tremendously.

Tobacco Plant

A large tobacco plant wanted a clean plant, was anxious to have clean floors especially, to create a good impression. Because of the necessity they employed hand scrubbing at a terrifically high cost. The excessively high cost of hand scrubbing was so discouraging to the management that they searched for a cheaper method of scrubbing. A combination machine was the result, and now that one machine has grown to three, so economical and effective has been the scrubbing job done. The plant had about 100,000 square feet of floor area. It required 70 men for 2½ hours once a week. They did a good job, but that job cost $113.75 a week for labor alone. This scrubbing operation was in addition to the

regular cleaning crew. Two scrubbing machine crews did the same job for $33.60 per week, including the cost of the machine's services. The saving was over $4,000 per year. In other words, on one third of his floor, this manufacturer saved enough in one year to more than pay for his equipment. In fact, it was closer to six months than a year. The work is now done quickly and easily on week-ends, and does not interfere with production.

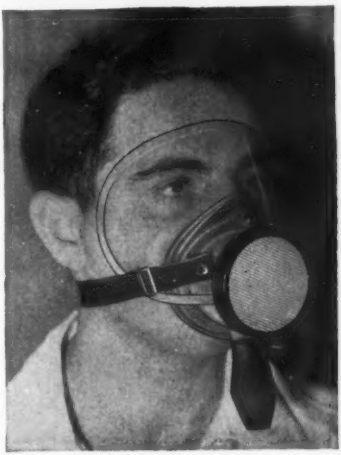
Because of the high degree of cleanliness achieved, this plant is a show place, and visitors are encouraged to come.

User's Reaction

The use of industrial floor scrubbing has grown materially in recent years, and more and more users are saving money by this procedure. Representative of the general attitude is Continental Mills, Inc., of Philadelphia. They say: "Our new floor cleaning equipment is doing a splendid job. We are very well pleased with it. The total floor space covered weekly with one of the cleaning units, utilizing all of one man's time, is in the neighborhood of 50,000 square feet. However, there is no doubt a greater area could be covered at the same time at a saving in labor cost, if it were clear, open floor, unobstructed by machinery, and if the work did not have to be done on schedule that does not interfere with the productive activity in the departments."

One of the fundamental parts of good housekeeping, floor scrubbing can be done quickly, at a considerable saving, to promote greater safety and economy.

NEW! Pulmosan Shield-Respirators



Combine Plastic Eyeshield with Pulmosan Respirators

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The eyeshield is of strong, clear plastic, weighing only ½ ounce. It arches over the respirator and is fastened with the headband snaps. Snug, comfortable protection and full, unobstructed vision are obtained. Shield is easily removed for cleaning or replacement. The complete assembly is available in many models of Pulmosan Respirators. Separate eyeshields obtainable.

WRITE TODAY for details and prices, outlining your conditions.

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Dept. OH, 176 Johnson St., Brooklyn, N.Y.

This month in *Washington*

Good Housekeeping Programs Yield Profits

By W. T. CAMERON, Chief Safety Adviser, U. S. Department of Labor

ONE SPRING, some years ago I had the doubtful pleasure of playing the leading role in an amateur theatrical called "Beauty From Ashes." This epic had principally to do with a feudin' mountaineer whose killin's and drinkin' bouts and slovenly habits went right along with the dirt and filth of his ramshackle mountain cabin. Following the shooting of a revenooer and other dire events, our hero got religion, a bath and a new suit of overalls. All ended well with these lines, "Yes, Melissey, we'll fix up the place, you and me and little Joe—we'll bring beauty from ashes 'til our little home blossoms like the garden of Eden."

I don't know why it is that sulphur and molasses, thoughts of love and clean-up campaign should be synonymous with spring, unless perhaps we are the victims of some subtle sales campaign on the part of the Sulphur and Molasses Producers Association, the fair sex, and the safety movement. At any rate, as the last bit of dirty snow melts in the back yards of American industry, we begin to stir ourselves and think about a good house-cleaning.

Regardless of how good the regular maintenance program may have been during the winter, no matter how good the regular janitor service or the intentions on the part of management and men, spring finds us with a pile of accumulated junk, dirty windows, over-flowing waste cans, lockers full of old clothes. So we launch a special clean-up campaign with a notice on the bulletin board, "Clean-up begins Monday, April 8. Everybody get ready for the grand clearance! Old clothes, greasy rags, waste and junk must go."

Workers, just like people, are the the product of their environment.

Slovenly, messy, sloppy habits and conditions at the factory are reflected in the living conditions at home and affect the general tone of the community. But the spirit of an industrial clean-up campaign soon makes itself felt in the homes and lives not only of the employees, but by the school, the city hall, the grocery store and every phase of community life.

Paul W. Garrett, Director of Public Relations, General Motors Corporation, said recently, "A company's public relations are strongly rooted in its plant community relations. There is no place a company is so much liked or hated as where it lives. Employees and townsmen observe what goes on, exchange views. No company can get away from the opinion folks hold in its home town." So your spring clean-up campaign can be the beginning of your greater public relations program.

A real clean-up campaign usually yields now accumulated scrap iron, brass and other metals, enough used material with a resale value, second-hand machinery, etc. to pay for the non-productive time spent during the clean-up and sometimes a tidy little profit besides. One could go on enumerating tangible and intangible benefits which accrue from a general periodic house-cleaning. Fire prevention, increased operating efficiency, better industrial relations, are only a few.

But most important of all, the spring clean-up becomes the first step in a continuing housekeeping program which in turn is one of the most important factors in accident prevention. Good housekeeping cannot be had alone by an occasional grand clean-up and setting in order, but it certainly is an ideal first step.

Order

Then again, no matter how good your regular housekeeping procedure may be, the periodic clean-up is both materially and psychologically necessary. Just as the housewife carries on daily dusting, sweeping and cleaning—it is not until she moves everything out of the house and back in again (usually rearranging the furniture) that she realizes how much useless accumulation there was and how much dirt and disorder had collected in out of the way places.

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INDUSTRIAL SKIN PROTECTION **MILBURN CO.** DETROIT MICHIGAN

One safety engineer with whom I recently discussed this subject stated that housekeeping is more than just cleanliness—it is cleanliness and *order*. "A place is in order when there are no unnecessary things about and those that are necessary are in their proper places. . . . If it is clean also, floors non-slippery from grease, etc., light bulbs and windows clean, walls and overhead structures kept well painted, machinery and equipment kept neat and in order, and if aisles are properly marked and operations are carried on in an orderly manner, we have both good housekeeping and good order. Incidentally, where we find these conditions we find competent management and a low accident rate as well, for good housekeeping and orderliness are fundamentals of good management."

Fundamentals of Good Housekeeping

As you make plans for this spring's clean-up campaign and lay plans for the inauguration of your good housekeeping program for 1940, check the following fundamentals:

A. Are there racks, holders, bins or shelves for the storage of raw materials, materials in process and for tools and portable equipment? Have the supervisors and workers been instructed to replace equipment immediately after use and to clean up each workplace at the end of the day? A single bad housekeeper in an establishment not only leaves much disorder in his path, but sets an example which disrupts the morale of all.

B. Methods of piling materials and articles. Have you worked out your standards for piling various classes of material in relation to height of pile, strength of support, location of storage area, method of piling various shapes and sizes with particular attention to pipe and other long stock?

C. Disposal of scrap and waste. The old way was to let the floor catch the waste and then clean it up from time to time. A real job of planning includes estimating probable waste in advance and providing suitable means of collecting it as it is produced and disposing of it in the most economical and orderly way possible. (I once visited a sheet steel mill built with a basement with shoots under each machine leading directly below to

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BURNITOL Paper Cuspidors are water-proofed, wire stitched, substantial. Cost only a fraction of a cent, more than pay for themselves. Used by leading manufacturers everywhere. Size 6½" x 6½" x 3". Three grades.

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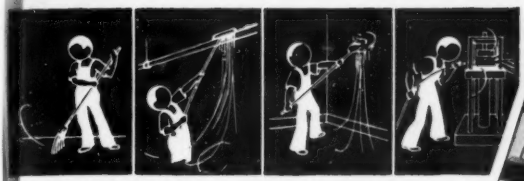

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HARTFORD

CENTRAL AND PORTABLE VACUUM CLEANING SYSTEMS

THE SPENCER TURBINE COMPANY, HARTFORD, CONN.

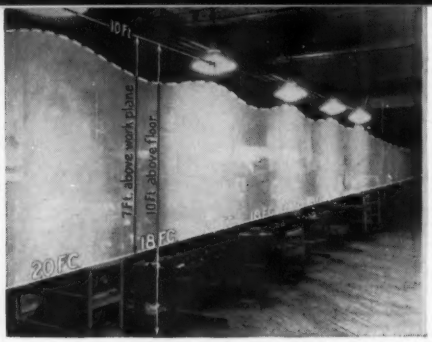
conveyor belts where crop ends and other hard-to-handle scrap was carried to the bailer or scrap bin "untouched by human hands." Water, grease and scale from the mills drained directly into suitable containers in the basement. Needless to say, the shop was immaculately clean and had one of the best safety records in the country.)

D. Lay-out of aisles and passageways. This is the time to mark out and paint the traffic lanes and reiterate the shop rules which prohibit the piling or placing of material or articles in aisle spaces.

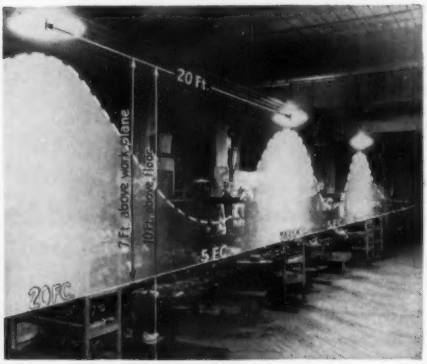
E. Lay-out machinery and equipment. While this is primarily a production rather than a housekeeping problem, your clean-up campaign should include rearrangement of machinery where possible. This is also a good time to repair and repaint machine guards and ventilation equipment.

F. This is the time to assign specific duties, such as window washing, emptying waste cans, sweeping, vacuum cleaning, which are to be carried on during the year, explaining carefully to the men who will do this work, when and how they are to do it.

So, if one of these bright, spring, sunshiny days you feel a peculiar gnawing way down inside, if the winter underwear begins to itch and you wonder how the fishing tackle and golf clubs weathered the winter, if your feet are hot and the girls look extra pretty, remember what Confucius say: "In spring sun send sap to clean up nature, but man no sap who clean up industry."

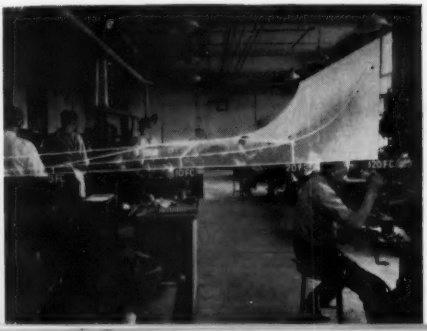


● *Improper spacing of light fixtures result in "roller coaster" lighting.*



● *By properly spacing the lighting fixtures, uniform lighting is provided over the entire work area.*

● *Daylight falls off rapidly the farther you get from the windows. Note insufficient amount of light at side of room away from windows. Artificial light should be used to correct this condition.*



LIGHTING, SEEIN AN

By DEAN ARR
General Electric Company, Nela Pngine
Clevela io

Proper lighting can aid in reduci e ac show that engineered lighti sen and impro ertn

EYES, minds and hands. Every employer pays wages to all three and the amount of wages paid is generally determined by the combined efficiency of this threesome. This can be expressed another way. If an employee has impaired or subnormal vision, the employer would probably hesitate to have him tending the expensive machinery in his plant. He may also fear that the workman might have an accident simply because he couldn't see what he was doing. Unless he has good skillful hands, too, management would hesitate to entrust him with any job requiring a high degree of accuracy. And unless he had brains, wouldn't the employer hesitate to have him working on a manufacturing job that required judgment?

The interesting thing about this threesome of eyes, mind and hands, is that the betterment, maintenance or control of two of them, hands and mind, are strictly within the control of the employee himself, and the employer can do very little about them. The other third of that craftsman's attributes, however, his seeing, is largely the responsibility of the employer. If the craftsman has failing eyesight, about the only thing he can do to better that eyesight is to go to an eyesight specialist and have his

EEIN AND SAFETY

DEAN ARREN
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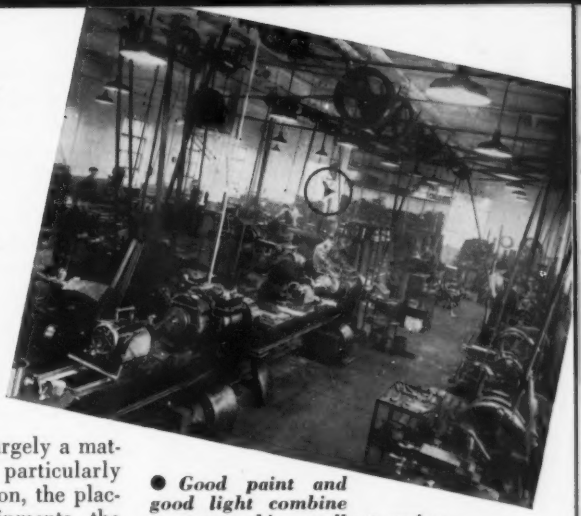


● *Good paint and good light combine to create this excellent seeing environment. General overhead lighting is properly spaced to insure uniformity, and supplementary lighting (in circle) is provided for a particularly critical job.*

eyes equipped with lenses to correct, so far as possible, that impaired vision, but beyond that his seeing is largely a matter of plant conditions; particularly the amount of illumination, the placing of the lighting equipments, the freedom from glare, flickering shadows and all of the other things that go to make a good or a poor lighting system.

We might say that we have available two kinds of light—positive and negative. Positive light is represented by footcandles on our work. The more we have, the more we see. Negative lighting is light in our eyes. The more we have, the less we see. The ultimate objective of the illuminating engineer, and the reason for using various lighting equipment, is to convert, as far as possible, raw, glaring, negative light into positive footcandles on the work.

The experience of positive and negative light is a common one with all who drive automobiles on the highway at night. As long as the driver has the road all to himself, and as long as his headlights are working and aimed correctly, he sees reasonably well by the positive light from the headlight lamps. But the instant he meets an oncoming car and the driver fails to shift to his passing beam, he begins to experience the ill effects of negative illumination. Too often the same thing, with modifications, of course, happens in the factory.

Glare does not necessarily mean too much light. Glare conditions often exist where there is too little light. Glare always results in a waste, not only of light but also of time and materials, since it interposes an obstacle to easy seeing. Worst of all it raises the possibility of accidents, because where glare is present seeing is subject to strain.

The principal causes of glare are (1) unshaded light sources, (2) lighting equipment which does not confine the light to the proper angle but directs an excessive amount to

the eyes, (3) lighting units that are equipped with lamps that are too large for them, (4) units with excessively high brightness at the angles reflected to the eye by shiny material,

● ***An example of negative light. Because of the improper placing of the supplementary light, 60% of the useful light is wasted. Workers cannot see properly when exposed to glare, or looking into a strong light.***

(5) improper location or adjustment of equipment which permits bright reflections of the source to reach the eye.

Shadows are another sign of needed lighting improvement. They constitute definite accident hazards by obscuring objects that should be seen. They slow up work and are likely to cause errors in operation. Shadows may be caused by (1) inadequate diffusion of light, (2) the wrong placement of light sources, (3) failure to provide a sufficient number of sources, (4) the use of local lighting with no general lighting.

So much for the factors which can create an unsafe seeing environment. Now let's see how proper lighting can aid in reducing the accident liability. First of all there is the question of the amount of light required for easiest seeing. The most desirable quantity of light for any particular installation depends primarily upon the work which is being done. The degree of accuracy, the fineness of detail to be observed, the color and reflectivity of the work, as well as those of the immediate surroundings, will affect greatly the illumination which will produce optimum seeing conditions. Because of the intimate interrelation between these factors and the inability of the eye alone to estimate the lighting effect, experienced judgment plus measurement with the proper instruments are necessary to prescribe the right amount of light for a particular task. The ideal result is obtained when the illuminating engineer, who knows the how and why of lighting, co-operates with the workman who knows what he must see to perform his task.

In an interesting laboratory test conducted some time ago with two groups of workers, one with good eyes, the other with poor eyes, the first group increased their rate of working 14 per cent when the lighting was raised from 3 to 12 foot-candles and those with poor eyesight increased their rate of working by 22 per cent, indicating that light acts as a magnifier of details, makes seeing easier and therefore safer, for the quicker a workman can see danger the quicker his response and the less likelihood that he will have an accident.

Proper lighting can lessen nervous tension and thus improve alertness. In our laboratory people were given the simple task of reading a book

for one-half hour each week. This test was conducted over a period of a year and the only change made was in the lighting which was increased. The values selected were 1, 10 and 100 footcandles. Each subject was asked to place his left hand on a button on the table and told to push that button as he finished reading each page. He was not instructed to try to read fast; the button apparently controlled a timing device to indicate what happened as the lighting was varied. What the subject did not know was that we were not at all interested in having that button pushed at the end of each page. The button was a subterfuge which recorded continuously on a revolving drum the amount of pressure exerted by the hand all of the time the reading was being done, and it was discovered after thousands of tests that there was a direct relationship between low illumination and heavy pressure on the key. The higher the illumination, the greater the relaxation and the less the pressure. When reading under 100 footcandles the nervous muscular tension was about two-thirds as much as under 1 footcandle, which is just another way of saying that the worker doesn't get as tired working under good illumination as when he works under poor illumination. It is a well understood fact that tired workmen are more susceptible to careless accidents.

In providing a good seeing environment it is desirable that there be good general lighting throughout any particular work area since where the lighting is very uneven, with extreme contrasts between bright and dim areas, eyestrain generally results. Seeing is then difficult because the worker's eyes are continually trying to adapt themselves to the many lighting conditions in the field of view. To this general lighting is then added supplementary lighting for those seeing tasks that require more lighting than can be economically provided by the general lighting alone. In using this combination lighting, of general plus supplementary, care must always be taken to insure reduced contrasts between the point of work and surrounding areas by providing a sufficient amount of general illumination. Experience indicates that the ratio should not exceed 10 to 1 which means that one hundred footcandles of supplementary lighting can be provided for every ten footcandles of general lighting.

There is no simple formula for safety. It is a complex subject as every reader of this magazine knows. However, since seeing is required for practically every industrial task if the employee is to know what he is doing, and since efficient seeing is dependent on good light, it certainly follows that good lighting is one of the indispensable aids in gaining management's ultimate objectives—satisfied workmen, safer plants.

● ***Good lighting is a tool of production. It can't be done without. Just as tools are sharpened, so must the tools of lighting be maintained. Clean fixtures give better, more economical light.***

Right off the Docket

The trend of litigation on workmen's health and accident compensation is reflected in these briefs of the latest and most representative cases coming to trial in the intervals between issues. Familiarity with this trend is important to every industrialist.

Over-Exertion Causes Heart Strain

The employee in this case worked for a cash register company. He called on one of the company's customers to service his register, and after working for a short while decided it was necessary to take the register to the factory for the required repairs. He informed the customer that he would substitute another register during the time the broken one was being fixed; that there was one in the truck outside. The employee was seen to go to the truck, reach into its interior with his extended arms, upper body, shoulders and head. He was seen to remain in this position for about five minutes without change. This appearing to be unusual, some observers went to see what had happened. They found the employee unconscious, and with his arms wrapped around a cash register. The register weighed about 240 pounds, and had been dragged from a position further back in the truck. By the time a doctor arrived the employee was dead.

The doctors testified that the employee had a pre-existing chronic myocarditis (inflammation of the muscular walls of the heart) of long duration; that the exertion of moving the cash register had caused a dilation of the heart resulting in death. The Court held that the circumstances warranted a finding that the death was due to an "accident" arising out of and in the course of employment. *Mapes vs. Thrall, et al.* (New Jersey), 10 Atl. (2nd) 279 (Oct., 1939).

Over-Heating and Over-Exertion Results in Death of Boiler Fireman

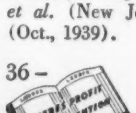
Compensation was sought in this case for the death of a boiler fireman. The employee who had heart trouble, hardening of the arteries and high blood pressure died suddenly, shortly after he had finished shoveling fuel into the furnace. It was shown that a great deal of heat was thrown off from the open furnaces, and that under the conditions the job of keeping the furnaces going was quite exhausting.

The Court said that the death of the fireman was compensable as resulting from an "accident"; that the facts and circumstances surrounding the death lead to the conclusion that the death was hastened by the over-heating and over-exertion arising directly from performing duties in connection with his employment. To say that the deceased, in his condition, might have died suddenly at home or in any other place is merely entering the field of speculation. *Ozbolt vs. Weber-King Mfg. Co., et al.* (Louisiana), 193 S. 383 (Jan., 1940).

* * *

Court Holds Brain Disease Claim not Barred

In May, 1935, the employee was struck on the head by the metal end of an air hose. He was taken to a hospital and treated for a laceration and concussion. He returned to work in two days. No claim for compensation was filed, or could have been filed, because under the compensation act the first seven days of disability are not compensable. In November, 1936,



the employee started to ail, and was unable to attend work regularly. In the spring of 1937, a psychiatrist informed the employee that he was suffering from a progressive disease of the brain caused by the accident in May, 1935. In August, 1937, a claim for compensation was filed.

The Company argued that since a claim for compensation must be filed within one year after the injury, this claim should be barred since more than a year had elapsed from the time of the happening of the accident in May, 1935. The Court in making an award rejected this contention. It said, "injury" doesn't mean "accident," but refers to "compensable injury," and consequently the limitation time in this case didn't commence until 1936 or 1937, the time when the worker became disabled, or the time when he discovered that the disability was due to the accident of 1935. *Potomac Electric Power Co. vs. Cordillo, Deputy Com'r* (Kicklighter, intervener) (District of Columbia), 107 Fed. (2nd) 962 (Nov., 1939).

* * *

Employee's Negligence and Violation of Company Rule Doesn't Prevent Award

A packing house employee suffering an attack of indigestion went to an adjoining pickling room to get a drink of water. In that room he noticed a barrel containing a substance which looked like, and which he thought to be, baking soda. The barrel was painted red to denote danger, and labeled "sodium nitrate." The employee dissolved some of the substance in water, drank it, and became fatally ill.

The Company resisted a claim for compensation on the ground that the death did not arise in the course of employment; that the death was caused by an act of self-medication in violation of a company rule requiring ailing employees to report to the company hospital.

The Court granted an award to the widow and children of the deceased employee. It said, "Acts essential to life, comfort, and convenience of employees while at work are incidental to his service, and injuries sustained in their performance 'arise out of the employment' and are compensable. The violation of the rule governing employees did not remove the employee from the course of his employment." There was no question but that the employee in this case was negligent, but the Court said that negligence of an employee is not a factor in a workmen's compensation case. *Security Mutual Casualty Co. vs. Wakefield* (U. S. Cir. Ct. of App., 5th Cir.) (Texas), 108 Fed. (2nd) 273 (Jan., 1940).

* * *

Denial of Compensation for Death from Heavy Lifting Held Incorrect

The employee in this case was a man 65 years old. He worked for a motion picture company, and had been employed in the same type of work for 15 years. His job required him to do heavy lifting, moving cameras, lighting equipment and other properties on the production sets where the motion pictures were filmed. One day while moving a heavy parallel weighing over 500 pounds with the assistance of a co-worker he experienced pains in his chest. He continued to work a number of days thereafter, continuously complaining of pain near his heart. A week after the worker had felt the first pain while moving the heavy parallel he died. A diagnosis disclosed that the death was due to acute dilation of the heart, and that the employee had been afflicted with a weak heart for some time. The Compensation Board refused to make an award.

On appeal the Court reversed the Compensation Board holding that the denial of compensation in this case was in error. The Court said, "If an employee afflicted with a weak heart subjects himself to extraordinary strain in the course of his employment, which causes his death sooner than he otherwise might have suffered, his dependants are entitled to compensation." *Blankenfeld vs. Industrial Accident Commission* (California), 98 Pac. (2nd) 584 (Jan., 1940).

Digested and Compiled by
HILTON E. ROBERTS
Member of the Ohio and
New York Bar.

PROTECTIVE HOOD. Protection of workmen against the occupational diseases caused by inhalation of dust or fumes is offered by a new light, comfortable hood introduced by Jackson Electrode Holder Company.

Clear vision, together with perfect eye and face protection, are afforded by a

standard 6½ x 9¾ inch Plastacele window. This outfit has been found effective in foundries, granaries, cement and lime plants and other locations where dust conditions prevail.

The window unit may be easily removed and replaced by a black fibre unit having a 2¼ x 4½ inch clear opening, for use on paint spraying operations. Constant flow of air outward through the opening provides ample protection.

AUTOMATIC FEEDER. Feeding a forming die is a hazardous operation. In the new Automatic Feeder developed by A. R. Pollasky, it is claimed that safety and increased production is assured. The feeder can be used with any size or style of press and can handle all blanks. This unit consists of a table and carriage and can be furnished to operate directly behind a press.

IMPROVED REFLECTOR. The Seprable Reflector, a development of the Goodrich Electric Company of Chicago, is now furnished with a new hood of rolled steel construction which combines lightness with greater strength.

The greatest possible simplicity is provided in this fixture through its "come-apart" design. It takes a quarter turn to release or attach the reflector. There are no screws, nothing to loosen or corrode. The fixture is fitted with a resilient socket which is also removable and which can be

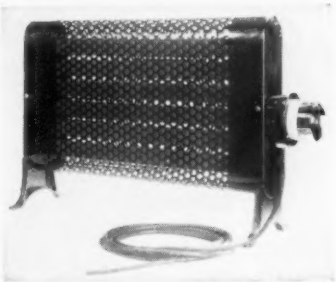
replaced at small cost. This socket is spring mounted to absorb vibration and lengthen lamp life. The Improved Seprable Reflector is finished in permanent porcelain enamel.

Additional information and descriptive literature on any of the products mentioned in this service department may be obtained by writing ***Dept. N,*** OCCUPATIONAL HAZARDS, *812 Huron Road, Cleveland, Ohio.*

THE FIELD

NEW AIR HEATERS. A new line of wall and floor mounted air heaters, constructed to solve heating problems for specific applications, is announced by Westinghouse Electric and Manufacturing Company, Mansfield, Ohio.

The ease of installation and clean, steady, odorless heat makes these units particularly desirable. They are designed for use with either a three-heat hand switch or a Westinghouse Type AA thermostat.



The wall mounted air heaters range from 25⅛ to 31¾ inches in length and are from 10⅜ to 16⅞ inches high. They have a rating of 1000 to 4500 watts and operate on 115, 230 or 440 volts.

The floor mounted air heaters have approximately the same heating surface in inches and the same wattage rating as the wall mounted units, but they are only made to operate at 115 or 230 volts.

MIDGET DUST AND FUME COLLECTOR. Combining the features of larger equipment, the Claude B. Schneible Company's new Multi-Wash Collector is a single self-contained "streamlined" unit. The Collector consists of a Multi-Wash unit, a Sludge-settling tank, Recirculating Pump, Suction Fan and a Sound Deadening Diffuser Pad. It is recommended for use in all dust creating operations where the problem can be handled most expediently by smaller equipment.

LIGHT BEVEL SAFETY STAMPS. M. E. Cunningham Company announces new light bevel stamps which do not mushroom or spall, and due to the new alloy steel used, makes it possible to have a stamp

with the strength of ordinary heavy bevel stamps while at the same time being 35% lighter. This lightness makes the light bevel safety stamp much easier to handle, and in stamping finished surfaces a far greater degree of accuracy is possible.

SKID-PROOF PAINT. United Laboratories, Inc., announces an improved paint which forms an abrasive plating of a refractory nature. Its application tends to prevent slipping when it is applied to floor surfaces. Armor-Plate paint can be obtained in various colors.

PAINT SPRAY equipment for light jobs has been designed by the Binks Manufacturing Co., Chicago, Ill. This inexpensive spray handles average viscosity paints, enamels, lacquers, varnishes and insecticides.

Statements made in connection with any product mentioned in this service department are based on manufacturers claims. Although these claims are believed to be true, this magazine does not guarantee that to be the case.

General Motors . . .

(Continued from page 25)

gray, with liberal chrome plating on exposed metal parts. This decorating scheme, plus the lighting just described, make it nearly impossible for a workman to indulge in bad housekeeping.

As in all the other phases of the plant's design, the attractiveness and cleanliness of the plant is done with two thoughts in mind—First, to promote workers' well-being; Second, to minimize the possible impairment of efficiency or interference with quality of product.

Safety

As an example of the manner in which plant design promotes safety, consider the arrangement of the heat-treating department. Usually, furnaces are some five feet or so from the floor, requiring workmen to stand on a platform and lift work up to place it in the furnace. This is a potential source of accidents, as well as being not conducive to greatest efficiency. In the Allison plant, the ovens and cooling tanks are half sunken through holes in the floor. This brings the top of the ovens within easy reach of the workers without the necessity of standing on platforms, which reduces the possibility of strains and accidents.

Prevention Plus Cure

Having done virtually everything known to modern science to make the Allison plant a safe, desirable place to work, General Motors has taken the added precaution of installing a doctor's office and hospital and first aid room in the office building of the plant. Here workers are given further assurance that everything possible is being done for their healthful, safe performance of their jobs.

Good housekeeping is simply another way of saying a plant is efficiently, cleanly, and safely run. The ultimate objective of plant management is to produce its product with a maximum of quality, efficiency, and economy. It goes without saying, therefore, that good housekeeping is as much a necessity in good plant operation as is raw material. Any plant, whatever its original condition, will benefit from good housekeeping practices, but when a plant can be built from the very beginning to embody all that makes for good housekeeping, as was the Allison plant, efficient, safe operation is almost a foregone conclusion.

Plant Sanitation . . .

(Continued from page 15)

the air of the workroom with proper ventilation and exhaust systems leading to the outside air.

It is evident, therefore, that plant sanitation is very important in maintaining the health and efficiency of employees. Since so much depends upon cleanliness and ventilation, the need for good housekeeping and an adequate supply of fresh air cannot be over-estimated. It is believed that proper attention to these essentials will do a great deal in the elimination of occupational diseases and the promotion of health among all workers. It is true that a great deal has been accomplished during the past few years, but there are very few plants that have attained ideal conditions and there is, therefore, a great deal to be done by all who are interested in plant sanitation.

NEW DOUBLE HEAD-BAND

Patent Pending

Increases the Comfort and Safety of the

AMERICAN R1000 DUST AND R1000-C CHEMICAL RESPIRATORS

This new design provides two bands . . . which can be worn as one band, when goggles are also worn . . . or fitted with one band below the ears, and the other up over back of head (as shown).

This double band is self-adjusting . . . assures greater comfort because tension of bands is equalized. And the mask is kept securely sealed to the worker's face, no matter how he moves his head.

Only the American R1000-C Respirator offers this important advantage. And there are many other exclusive features that prove . . . when you buy respirators either for Type A Dusts, pneumoconiosis-producing and nuisance dusts or for non-lethal vapors, paint spray . . . it pays to:

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2. **CC1-Fill:** For low concentrations of light organic gases and vapors (paint spray).
3. **CC2-Fill:** For low concentrations of acid gases and vapors.
4. **CC3-Fill:** For low concentrations of acid-organic gases and vapors.

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